Problem 2 Let L be the language defined by the regular expression:

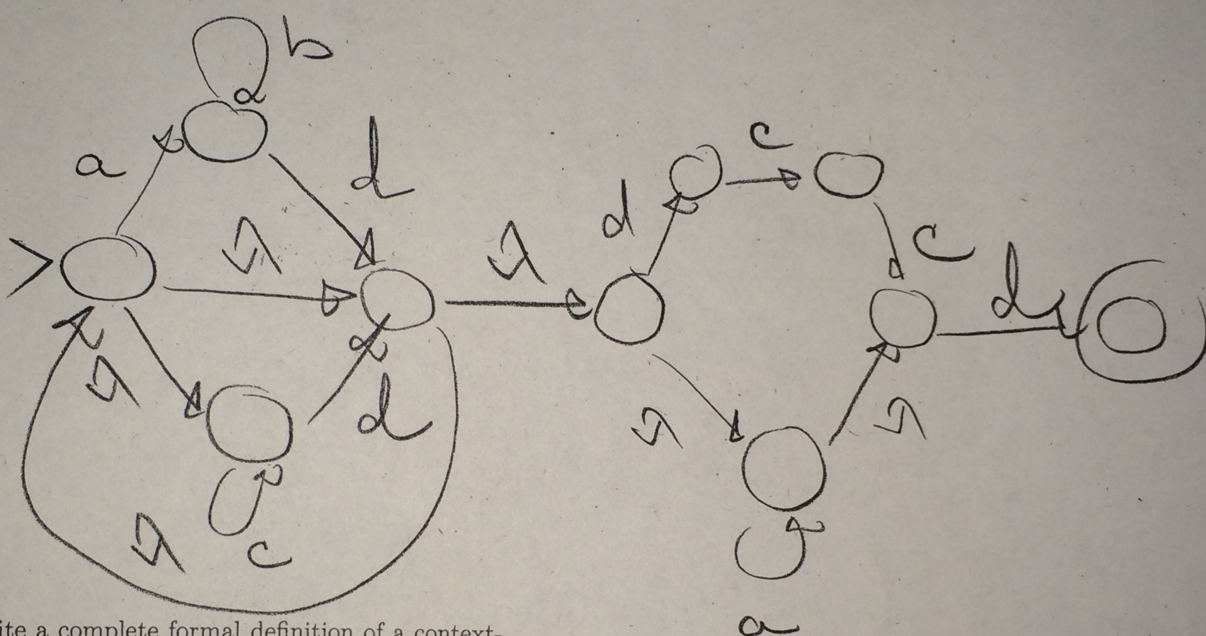
LAST NAME: Solution

FIRST NAME:

$$(a\,b^*d \cup c^*d)^*\,(dcc \cup a^*)\,d$$

(a) Draw a state-transition graph of a finite automaton that accepts the language L. If such an automaton does not exist, state it and explain why.

Answer:



(b) Write a complete formal definition of a context-free grammar that generates the language L. If such a grammar does not exist, state it and explain why.

Answer:

$G = (V, \Sigma, P, S)$

$\Sigma = \{a, b, c, d\}$

$V = \{S, A, B, K, D, E\}$

P: $S \to EDd$

$E \to \lambda \mid EE \mid aBd \mid Kd$

$B \to bB \mid \lambda$

$K \to cK \mid \lambda$

$D \to dcc \mid A$

$A \to aA \mid \lambda$